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Evaluating an In-School Drug Prevention Program for At-Risk Youth

This study assessed an in-school program aimed at preventing or reducing drug use and other deviant behavior in a sample of 167 at-risk youth in their transition years. Over 10 weeks, 17 one-hour sessions were offered to youth who were identified using a self-report questionnaire (at 9 schools with 12 control sites in Ontario, Canada). Repeated measures analysis of covariance was used to assess program impact at posttest and six-month follow-up. Program participants, compared with the control group, reported less frequent drinking,

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cannabis use, nonprescribed tranquilizer or sedative use, and self-reported theft, and improved attitudes toward school (posttest only). They also reported less supportive attitudes toward alcohol, tobacco, and cannabis use, and less risky drinking behavior (posttest and follow-up). There were no program effects for any of the personal and social competence or life skills measures (e.g., self-esteem, social skills).

Cette étude évalue un programme d'intervention en classe dont le but est de prévenir ou réduire la consommation de drogues et d'autres formes déviantes de comportement au sein d'un échantillon de 167 jeunes à risques qui vivent leurs années de transition. Pendant une période de 10 semaines, on a offert 17 ateliers d'une heure chacun à des jeunes qui avaient été repérés par un questionnaire d'auto-évaluation (dans 9 écoles en Ontario, au Canada, avec 12 sites témoins). On s'est servi d'une analyse de covariance à mesures répétées dans l'évaluation de l'impact du programme à un post test et à un suivi 6 mois plus tard. Par rapport au groupe témoin, ceux qui avaient participé au programme ont indiqué dans leur questionnaire qu'ils consommaient moins d'alcool, de cannabis et de calmants vendus sans ordonnance. Lors de l'auto-évaluation, les participants ont aussi indiqué qu'ils volaient moins souvent et que leur attitude face à l'école s'était améliorée (au post test seulement). De plus, ils ont témoigné d'attitudes moins coopératives face à la consommation d'alcool, de tabac et de cannabis, ainsi qu'un comportement moins téméraire lors de la consommation d'alcool (au post test et au suivi). Le programme n'a pas influencé les mesures de leurs compétences personnelles ou sociales, ou leurs habiletés de base (par exemple, l'estime de soi, les aptitudes sociales).

Introduction

In recent years experts in the field of drug prevention have redirected much of their attention away from moderately successful primary prevention programs aimed at general student bodies to more focused interventions for at-risk youth (Bry, 1982; Dishion & Andrews, 1995; Eggert & Herting, 1991; Eggert, Seyl, & Nicholas, 1990; Eggert, Thompson, Herting, Nicholas, & Dicker, 1994; Haggerty, Wells, Jenson, Catalano, & Hawkins, 1989; Johnson et al., 1990; Mills, Dunham, & Alpert, 1988; O'Donnell, Hawkins, Catalano, Abbott, & Day, 1995; Schinke, Jansen, Kennedy, & Shi, 1994; Shannon & James, 1992). Similar interventions have been developed in other fields to help prevent or curb problems such as truancy, low academic achievement (Arbuthnot & Gordon, 1986; Catterall, 1987; Gottfredson, 1986), aggression (Dubow, Huesmann, & Eron, 1987), and delinquent behavior (Arbuthnot & Gordon, 1986; Bry, 1982; Gottfredson, 1986).

Targeted interventions for at-risk youth have gained popularity for several reasons. There is compelling evidence that finds that risk factors for youth who abuse drugs are fewer in number and distinctly different from factors influencing nonabusers (Brook, Cohen, Whiteman, & Gordon, 1992). Consequently, programs for youth classified as *abusers* may need to be fundamentally different from programs for youth classified as *experimenters* or *moderate users* both in terms of content and intensity of effort (Dishion & Andrews, 1995; Eggert et al., 1994; Newcomb & Bentler, 1989; Tobler, 1992).

In addition, because adolescents who abuse drugs are more likely to experience serious social and health-related consequences at a later age, many believe that health care providers and other community professionals should be doing more to prevent further escalation of abuse among this group. Much of the concern stems from recent figures for the period since 1992 showing an increase in a wide range of risky drug behaviors among students including consumption of five or more drinks of alcohol per drinking occasion and heavy

and frequent use of tobacco, as well as cannabis and other illicit drugs (Adlaf, Ivis, Smart, & Walsh, 1995; Johnston, O'Malley, & Bachman, 1996).

Finally, proponents of targeted programs note that adolescent drug abuse is highly correlated with various forms of mental illness such as depression and anxiety, as well as a number of undesirable behavioral outcomes including school truancy and drop-out, theft, violence, heightened sexual activity, and suicide (Greenwood, 1992; Irwin & Maag, 1993). Studies have shown that common etiological pathways are responsible for the interconnectedness of these problems; evidence of a syndrome of behaviors of which drug abuse is only one component (Jessor & Jessor, 1977; Vingilis & Adlaf, 1990). At-risk youth, therefore, are said to require comprehensive programming that targets multiple risk factors common to a variety of behaviors (Greenwood, 1992; Irwin & Maag, 1993).

The present study evaluates the impact of one in-school program (Opening Doors, Addiction Research Foundation, 1995) aimed at preventing or reducing drug use and other deviant activities (e.g., truancy, delinquent behavior) among at-risk youth in their transition years (i.e., students in grades 8-10).

Program Description and Objectives

The Opening Doors program is aimed at at-risk youth in their transition years between elementary and high school. The transition years are a period marked by change when many youth become increasingly conscious of their own self-concept and identity as well as the physiological changes associated with puberty. It is against this backdrop of physiological and psychological change that young people enter high school. In moving to a new school many adolescents must adjust quickly to unfamiliar surroundings, new friends and teachers, and new expectations in the area of academic performance (Felner, Ginter, & Primavera, 1982). Not surprisingly, studies show that entering a new school is linked with academic and behavioral problems, increased anxiety over meeting school expectations, and problems gaining acceptance among peers (Felner et al., 1982; Simmons, Burgesson, Carlton-Ford, & Blyth, 1987).

The Opening Doors program is grounded theoretically on the social competence skill training approach (Botvin, Baker, Filazzola, & Botvin, 1990). This approach emphasizes teaching adolescents specific skills (e.g., social skills, communication skills) designed to enhance personal and interpersonal effectiveness. To prevent the development of maladaptive behavior, young people are taught developmentally based skills and are exposed to pro-social and health-enhancing beliefs and values. The approach incorporates the etiology of drug use by addressing social, cognitive, biological, attitudinal, and developmental factors.

Long-term objectives of Opening Doors include the prevention and reduction of alcohol and other drug use, deviant behavior (including property crimes and violence), behavioral problems at school, truancy, and school drop-out. Intermediate or short-term objectives include: improvements in academic achievement and positive attitudes toward school; increases in self-esteem, self-concept, and perceived competence; favorable changes in attitudes toward alcohol and other drug use; improved coping, peer refusal, and social skills; and enhancement of positive peer and family interactions.

Opening Doors consists of two separate program components that run concurrently: a student program and a parent program. The student program comprises the instructional and peer support components of a multifaceted prevention model program. Seventeen sessions of approximately one hour in length are offered once or twice weekly over a 10-week period. Through group activities and discussion the program aims to help students develop personal and social skills to enhance their school experience and relationship with peers, teachers, and parents. Ideally, the program accommodates 10 to 12 students at a time.

The parent program is designed for parents whose children participate in the student program. It consists of five evening sessions of approximately two hours in length held on alternate weeks over the duration of the student program. It is intended to foster a home environment in which parents actively support and reinforce their children's school experience and efforts to make positive lifestyle changes. Improved parent-child interactions, better management of their children's behavioral problems, and reinforcement and support of the student program are expected to contribute to a reduction of the prevalence and frequency of substance abuse, school drop-out, violent and other antisocial behavior, and an improvement in academic achievement.

The current study evaluated the effectiveness of the Opening Doors program in terms of its impact on behavioral outcomes such as delinquency, truancy, and substance use. Students identified as at-risk who completed the Opening Doors program and a control group of students who were identified as at-risk but who did not participate in the Opening doors program were compared on behavioral outcomes immediately post-program as well as several months later.

Method

Participants

Schools and staff. Twenty-one schools from 12 boards across Ontario participated, yielding 9 experimental schools and 12 control schools.¹ Each of the 9 experimental high schools agreed to allocate one staff member (e.g., a guidance counselor) to serve as a program leader. In addition to the school staff member, a professional from a community organization in the school's catchment area was procured as a second program leader (e.g., community social workers, counselors, and public health nurses). Training of program leaders in program content and delivery was provided by organizational community program consultants over a three-day period. Organizational consultants periodically met with program leaders to monitor and evaluate implementation.

Student sample and retention rates. In terms of the screening questionnaire (the first questionnaire administered), 2,168 grade 9 students out of a target of 3,913 from the 21 schools returned completed questionnaires. Response rates across schools ranged from 30% to 92%, with the average response rate of experimental schools at 55% and the rate for control schools at 56%. The overall study response rate for the completion of the student screening questionnaire was 58%. In order to address potential selection bias, comparisons between students who completed the screening questionnaire and a representative sample of grade 9 students in Ontario were conducted, and it was found that

the two groups were generally similar on demographic and behavioral (i.e., truancy and delinquency) variables.²

In total, 215 students, or 19% of the 1,121 experimental high school students with completed screening questionnaires, were identified as potential candidates for the Opening Doors program. Fewer than 50% of this group eventually ended up in the program ($n=100$). Student nonparticipation resulted primarily from lack of available space in the program (108 positions were available) and because of refusals by invitees and lack of parental permission. In the control condition 170 students out of a total of 1,047 (16.2%) who completed the screening questionnaire were identified as at-risk. Of this number, 120 (70.5%) participated in the pretest. Nonparticipants at pretest included refusals and students absent on the day of testing.

An analysis of attrition rates across time revealed fairly high retention rates—particularly in the experimental condition, with over 90% of respondents present at pretest also completing an immediate posttest. The percentage completing a test at all testing occasions fell just slightly to 87% at follow-up ($n=87$). In the control condition only 67% completed all testing occasions ($n=80$).

A demographic profile of the final sample of 167 students revealed that 56% were female, 80% were age 14, 73% reported living with both parents, and 58% had not moved in the previous five years. In terms of socioeconomic background, 23% reported at least one parent out of work, 19% rented their dwelling, 13% reported their mother's education as some high school or less (vs. 47% and 40% for completion of high school and postsecondary education) and 28% reported their father's education as some high school or less (vs. 25% and 48% for completion of high school and postsecondary education).

Procedures

In total, four questionnaires were administered: screening, pretest, posttest, and follow-up questionnaires were completed by students at four different times. All tests were administered in a central location such as a school cafeteria or library during school time. To ensure confidentiality, only organizational staff were present.

Screening. Screening questionnaires were administered and collected over a six-week period. Administration corresponded to two school periods, with an average completion time of 75 minutes. Students were instructed to print their full name on an attached face sheet containing a unique identification code and to remove the face sheet before collection. An identical code appeared on the top right hand corner of the first page of the questionnaire for confidentiality and tracking purposes. Using procedures described elsewhere (DeWit, Silverman, Goodstadt, & Stoduto, 1995; Newcomb & Felix-Ortiz, 1992), student responses were analyzed statistically to identify a group of individuals at risk of experiencing a variety of problems including drug use, truancy, behavioral problems at school, and violent and other antisocial behavior.

A random selection of the students in each experimental school who were identified as at risk were invited to participate until a maximum of 12 students had agreed to participate. Program leaders conducted personal interviews with students selected at each experimental site. Students were given a brief introduction to the program and then were invited to participate. Students were

assured that their decision to participate was completely voluntary. When students agreed to participate, parental permission was also obtained.

Pretest, posttest, and follow-up. Organizational staff administered and collected evaluation questionnaires across testing occasions: pretest (i.e., before the beginning of the Opening Doors program), posttest (1 month after completing the program), and follow-up (6 months after the program). The average completion time was 40 minutes. Responses on the posttest and follow-up questionnaires served as the outcome measures. Each questionnaire assessed substance use, attitudes, general deviance, school behavioral problems, school drop-out, attitudes toward school, academic achievement, peer refusal skills, social skills, coping skills, personal self-worth, and peer support.

Measurement

Substance use. Three measures of alcohol consumption behavior included number of alcoholic beverages consumed in the past month, frequency of alcohol consumption in the past month, and number of times in the past month students consumed five or more drinks of alcohol on the same occasion (a measure of risky drinking behavior). Two measures of illicit drug use included frequency of past month cannabis use and frequency of past month other illicit drug use (excluding cannabis). Items were assessed on either continuous scales or multiple-choice format scales with a general range of 5- to 7-point options.

Smoking was based on student self-reports of the number of cigarettes smoked per day in the past month. Abuse of sedatives or tranquilizers was measured based on self-reports of the number of times in the past month drugs not prescribed by a physician were taken to help relax, settle down, or sleep. These were continuous measures.

Students were asked to report the number of times they intended to use a particular substance in the next month. These intention items were measured on 4- or 5-point multiple-choice format quasi-continuous scales.

Attitudes. Attitudes toward substance use were measured using three separate subscales: attitudes toward drinking alcohol, using marijuana, and smoking (Botvin, Baker, Botvin, Filazola, & Millman, 1984). These attitude measures took the form of belief statements (e.g., "Cigarette smoke smells bad") to which participants indicated their agreement or disagreement on a 5-point scale. The alcohol subscale consisted of 10 items ($=.82-.85$), the marijuana subscale consisted of 11 statements ($=.71-.85$), and the smoking subscale consisted of 11 items ($=.81-.85$).

General *deviance* consisted of three separate subdimensions. Students were asked to respond to a checklist of items pertaining to past month frequency of violent behavior (7 items; $=.72-.78$), theft (4 items; $=.60-.67$), and drug-related activities (3 items; $=.72-.78$). For example, violence items included responses of Yes or No to involvement in gang fights or beating someone up, theft included Yes or No to breaking into a home or car to steal something or just to look around, and drug-related behavior included Yes or No responses to going to school drunk or high and selling cannabis.

School behavioral problems were measured indirectly based on a combination of two proxy questions: number of times received a detention in the past month and number of times sent to the vice-principal for misbehaving in the past

month. This was measured on a 6-point quasi-continuous multiple-choice format scale.

School drop-out was measured indirectly based on a set of items designed to gauge a student's likelihood of remaining in or leaving school. These included 4 items: number of times late for class in the past month; number of times late for class on Mondays in the past month; number of times skipped class without the permission of parents or the school in the past month; and number of times missed days of school without the permission of parents or the school in the past month ($=.74-.80$). These items had 5-point semicontinuous multiple-choice format response categories.

Attitudes toward school were assessed using an 8-item scale adapted from the Student Attitudinal Inventory for Program Outcome Evaluation on Adolescent Drug Abuse Prevention Programs (Kim, 1981). Students responded to items on a 5-point agree-to-disagree scale and included statements such as: "time spent in school is time wasted" and "most of the things I learn in school are important" ($=.87-.91$).

Academic achievement consisted of a four-item composite: perceived achievement in the past month; frequency of falling behind in class work in the past month; frequency of going to class without completing homework in the past month; and frequency of going to class without required books, paper, and pencils in the past month. These items were measured on a 5-point quasi-continuous scale ($=.72-.79$).

Peer refusal skills were measured indirectly based on a 10-item composite adapted from the Susceptibility to Peer Pressure Scale (SPPS, Dielman, Kloska, Leech, Schulenberg, & Shope, 1992). Participants were instructed to respond Yes or No to a series of hypothetical situations (e.g., If a friend dared you to hit or threaten a teacher, would you do it? and If a student dared you to tear a page out of a school library book, would you do it?). Factor analysis of the SPPS revealed three separate underlying dimensions: susceptibility to peer pressure to use drugs (3 items), pressure to misbehave at school (3 items; $=.56-.63$), and pressure to commit violence (two items). Because of severe skewness, peer pressure to use drugs was not included in the analysis.

Social skills were measured using the Social Anxiety Scale (Botvin et al., 1984). This 7-item instrument requires that students respond to statements (e.g., How often do you feel comfortable giving compliments? asking someone out for a date? making small talk with someone you just met? etc.) on a 5-point *none of the time* to *most of the time* scale. In the current study the reliability of this scale was good ($=.78-.79$).

Coping skills were measured using the 54-item Adolescent Coping Orientation for Problem Experiences Scale (A-COPE) composed of 12 separate sub-dimensions of coping behavior (Patterson & McCubbin, 1987). Our analysis of A-COPE produced a 7-factor solution substantially different from that generated by Patterson and McCubbin's analysis. Factor 1 explained the largest proportion of variance of the correlation matrix (17%). Eight items loaded highly on this factor and appeared to tap strategies for coping that involved seeking diversions (e.g., go to a movie, go shopping) or participating in demanding activities (e.g., do a strenuous physical activity, work hard at school work). Participants were asked how often they engaged in the activities in order to handle problems or stress, and they responded to the activities listed

Table 1
Adjusted Means Post Hoc Comparison of Experimental versus
Control Groups.

<i>Outcome variables</i>	<i>Experimental</i>	<i>Control</i>	<i>Experimental vs. Control Post Hoc Test</i>	<i>F</i>	<i>Adjusted F</i>
<i>Drug behaviours^a</i>					
<i>Risky drinking</i>					
Posttest	1.35	2.25	.01		
Follow-up	1.38	2.07	.01	11.13**	5.20*
<i>Frequency of alcohol use</i>					
Posttest	2.63	2.92	ns		
Follow-up	2.43	2.89	.01	6.94**	3.11 ^{ns}
<i>Cannabis use</i>					
Posttest	1.92	2.73	.01		
Follow-up	3.10	2.80	ns	10.85***	6.74**
<i>Used sedatives or tranquilizers not prescribed by doctor</i>					
Posttest	2.12	2.82	.10		
Follow-up	2.60	2.38	ns	3.39 ^{ns}	2.29 ^{ns}
<i>Attitudes^b</i>					
<i>Re Alcohol use</i>					
Posttest	24.98	28.71	.01		
Follow-up	23.15	27.90	.001	15.05***	10.52***
<i>Re Cannabis use</i>					
Posttest	28.71	31.23	.05		
Follow-up	27.92	31.84	.001	12.04***	9.63***
<i>Re Cigarette use</i>					
Posttest	21.50	24.99	.01		
Follow-up	21.08	24.15	.05	9.75**	9.75**

on a 5-point scale (1=rarely or none of the time, 5=most or all of the time). Factors two through seven were generally not interpretable. Consequently, only items corresponding to factor 1, referred to as coping, were retained in the analysis ($=.72-.78$).

Three measures of personal self-worth were included: self-esteem, self-concept, and perceived competence. *Self-esteem* was measured using the 10-item Rosenberg Self-Esteem Scale (Rosenberg, 1965). Participants responded to items (e.g., "On the whole, I am satisfied with myself" and "I often feel that I am a failure") on a 5-point *agree to disagree* scale ($=.83-.90$). *Self-concept* was measured by asking students to compare themselves with other students in their grade on a number of personality attributes and physical characteristics (e.g., how creative are you? shy are you? attractive are you?) (Ellis & Wild, 1998). Participants responded to these items on a 7-point *far more to far less* scale ($=.54-.66$). Perceived competence was measured using a 3-item scale developed by Botvin et al. (1984) (e.g., "I am able to handle difficult situations"). Students

Table 1 (continued)

<i>Outcome variables</i>	<i>Experimental</i>	<i>Control</i>	<i>Experimental vs. Control Post Hoc Test</i>	<i>F</i>	<i>Adjusted F</i>
<i>Deviance^c</i>					
Self-reported theft					
Posttest	4.75	5.24	.01		
Follow-up	4.83	5.01	ns	5.58*	3.40 ^{ns}
<i>School outcomes^d</i>					
Attitudes toward school					
Posttest	17.79	21.86	.001		
Follow-up	18.66	20.25	ns	13.78***	12.64***
<i>Psychosocial outcomes^e</i>					
Peer pressure to misbehave at school					
Posttest	4.24	4.63	.05		
Follow-up	4.07	4.36	.05	6.55*	4.96*
Peer pressure to commit violence					
Posttest	4.64	5.26	.001		
Follow-up	4.72	5.05	.05	12.47***	6.70**

Note. *** $p < .001$; ** $p < .01$; * $p < .05$.

^aError rate for family of behavior tests: $.05/6 = .007$.

^bError rate for family of attitude tests: $.05/3 = .017$.

^cError rate for family of deviance tests: $.05/3 = .017$.

^dError rate for family of school outcomes: $.05/4 = .013$.

^eError rate for family of psychosocial outcomes: $.05/7 = .007$.

responded to statements such as "I am able to handle difficult situations" on a 5-point *agree to disagree* scale ($=.69-.73$).

Peer support was measured using a single item. Participants were asked to rate how well they got along with their classmates in the past month (a 5-point scale ranging from *rarely or never got along* to *got along most or all of the time*).

Results

Data Analysis

To control for possible preexisting baseline differences between the experimental and control samples as well as sources of error variance on the dependent variables (i.e., the variance in outcome not associated with the program), all demographic and socioeconomic background variables including variables that indicated nonequivalence at pretest were entered as covariates into an analysis of covariance. All theoretically important correlates of each study outcome were also included. Post hoc comparisons were performed on the adjusted means (Games, 1990).

Students were used as the unit of analysis to provide more precise controls for preexisting differences between experimental and control groups at baseline and to yield more stable standard errors resulting in conservative program effects (Bell, Ellickson, & Harrison, 1993). However, to adjust for possible school level effects (i.e., design effects), within-school intraclass cor-

relations were estimated and adjusted for sex for each of the outcomes of interest. The resulting estimates were then used to inflate the standard errors of the program effects.³

All analyses were performed for participants present on all testing occasions. Transformations were performed for independent variables and outcome measures that were moderately to heavily skewed (Tabachnick & Fidell, 1989). Two-tailed t-tests were used to judge significance (Ellickson & Bell, 1990). To avoid the problem of chance findings due to multiple testing, the alpha used was determined by dividing by the number of testable hypotheses corresponding to each family of tests (e.g., tests pertaining to drug use attitudes) (Grove & Andreasen, 1982).

Outcome Evaluation Results

Repeated measures analysis of covariance was performed with condition (experimental vs. control) as the between-subjects factor, scores for the two posttests (i.e., posttest and follow-up) as the within-subjects factor, and the pretest score, demographic and socioeconomic background characteristics, and other theoretically important variables as the covariates.⁴ When a significant program impact or interaction effect was found, post hoc comparisons using t-tests were performed on the adjusted means to determine whether significant differences occurred at posttest or follow-up (Games, 1990). Significant program effects, including post hoc comparisons of adjusted means, are presented in Table 1.

Substance use behavioral outcomes. For risky drinking behavior (five or more drinks per drinking occasion in the previous month), a significant effect of condition occurred, $F(1,142)=11.13, p<.01$. This effect remained after adjustments for design effects, $F(1,142)=5.20, p<.05$. Post hoc comparisons of adjusted means at posttest and follow-up revealed significant group differences at posttest and follow-up, with adjusted mean values for risky drinking of experimental participants below those of control group participants.

In addition to risky drinking behavior, significant effects of condition were observed for frequency of alcohol use in the previous month, $F(1,142)=6.94, p<.01$. After adjustments for design effects, this result remained marginally significant, $F(1,142)=3.11, p<.10$. Post hoc comparisons of adjusted means revealed significant group differences—but only at follow-up—with the adjusted mean frequency of drinking value significantly lower than the value obtained for the control group.

For frequency of cannabis use, a significant group-by-time interaction effect was found, $F(1,143)=10.85, p<.001$. After adjusting for design effects, the effect weakened but remained significant, $F(1,143)=6.74, p<.01$. Post hoc comparisons revealed positive benefits of the Opening Doors program at posttest (i.e., an adjusted mean frequency value below the value obtained for the control group) but no significant group differences at follow-up.

A marginally significant group-by-time interaction effect was observed for frequency of nonprescribed tranquilizer or sedative use, $F(1,143)=3.39, p<.08$. After adjustments for design effects, the effect largely disappeared, $F(1,143)=2.29, p<.15$. Post hoc comparisons of adjusted means revealed significant group differences at posttest only, with Opening Doors participants

reporting significantly less frequent use of tranquilizers or sedatives compared with their control counterparts.

Attitudes toward drug use. Significant program effects were observed for attitudes toward the use of alcohol $F(1,146)=15.05, p<.001$. This effect was maintained after adjustments for design effects, $F(1,146)=10.52, p<.001$. Relative to the control group, Open Doors participants reported less favorable attitudes toward alcohol use. Post hoc comparisons of the adjusted means revealed statistically significant group differences at posttest and follow-up.

Significant program effects were observed for attitudes toward the use of cannabis, $F(1,145)=12.04, p<.001$. This effect was maintained after adjustments for design effects, $F(1,145)=9.63, p<.001$. Opening Doors participants reported less favorable attitudes toward cannabis use. Post hoc comparisons of the adjusted means revealed statistically significant group differences at posttest and follow-up.

Finally, a statistically significant effect of program was observed for attitudes toward cigarette use, $F(1,147)=9.75, p<.01$. Participants in the Opening Doors program indicated less favorable attitudes toward the use of cigarettes. This was significant at both posttest and follow-up.

Deviance. Beneficial effects of the Opening Doors program were found in terms of reduced self-reported theft, $F(1,142)=5.58, p<.05$. Adjustments for design effects resulted in a weakened but marginally significant effect, $F(1,142)=3.40, p<.10$. Compared with the control group, Opening Doors participants reported fewer incidents of theft. Post hoc comparisons of adjusted means revealed significant group differences at posttest only, with Opening Doors participants reporting lower incidents of theft.

School outcomes. We found evidence of a significant group-by-time interaction effect for student attitudes toward school, $F(1,144)=13.78, p<.001$. Adjustments for design effects resulted in a slightly attenuated effect, $F(1,144)=12.64, p<.001$. Post hoc comparisons of adjusted means revealed significant group differences at posttest only, with Opening Doors participants holding a more positive attitude toward school at the posttest. At follow-up this effect disappeared.

Psychosocial outcomes. A positive program effect was found for susceptibility to peer pressure to misbehave at school, $F(1,148)=6.55, p<.05$. Adjustments for design effects resulted in a slight attenuation of effect, $F(1,148)=4.96, p<.05$. Compared with controls, Opening Doors participants reported lower susceptibility to misbehave. Post hoc comparisons of adjusted means at posttest and follow-up revealed significant group differences, with Opening Doors participants scoring mean values below those found in the control group.

Significant program effects were also observed for susceptibility to peer pressure to commit violent acts, $F(1,148)=12.47, p<.001$. Adjustments for design effects reduced this value to $F(1,148)=6.70, p<.01$. Post hoc comparisons revealed significant group differences at posttest and follow-up with Opening Doors participants reporting lower mean scores compared with their control counterparts.

Discussion

This study evaluated the effectiveness of an in-school drug prevention program called Opening Doors aimed at preventing or reducing drug use and

other related problem behaviors (e.g., school drop-out, violent behavior) among at-risk students in their transition years (grades 8-10). Participation in the Opening Doors program resulted in several positive changes in student attitudes and behavior. Although moderate in strength, these changes included a reduction in frequency of alcohol consumption, consumption of five or more drinks of alcohol per drinking occasion, frequency of use of cannabis, and frequency of use of tranquilizers or sedatives not prescribed by a physician when compared with a group of at-risk students who did not participate in Opening Doors. Other positive changes included self-reported reductions in theft, less favorable attitudes toward substance use (i.e., alcohol, cigarettes, and cannabis), more positive attitudes toward school, less susceptibility to peer pressure to commit violent acts, and less susceptibility to peer pressure encouraging misbehavior at school.

The success of the Opening Doors program in eliciting positive change among our sample of at-risk youth may be attributable to several factors. First, attendance records among student participants remained high throughout the program. In addition, retention in the program and retention over the 12-month study period (from screening to follow-up) was high, with only 13 students of a total of 100 not participating on all testing occasions. These results compare favorably with retention rates obtained in other prevention programs. Hansen, Tobler, and Graham's (1990) summary of retention in a meta-analysis of 85 school-based prevention programs found a mean retention rate of 73.4% at 12 months since pretest.

The decision to recruit community health care professionals to serve alongside school personnel as program leaders may have also contributed to the success of the program. Tobler's (1992) meta-analysis of 91 drug prevention programs found that, next to programs led by mental health professionals only, programs led by a combination of mental health professionals and school personnel achieved the best effects. To account for this success, Tobler reasoned that outside professionals are removed from classroom disciplinary issues and thus are better able to establish close working relationships with students.

The comprehensive approach of Opening Doors, with its specific focus on promoting warm parent-child relations and positive interactions with peers and teachers, could have produced beneficial program effects. Previous studies have found that risk factors for adolescent drug use and other problematic outcomes are rooted in multiple environmental contexts such as the family, peer group, school, and community (Irwin & Maag, 1993). The likelihood of drug use is magnified when one or more risk factors straddle two or more environmental contexts. Predictably, previous studies identify successful school-based programs as those that attempt to effect change in risk factors located in several domains of influence (Dielman, Butchart, Shope, & Miller, 1991).

Studies have shown that school-based programs that receive strong support from school boards, principals, and teachers are the most likely to succeed in attaining their stated objectives (Gensheimer, Ayers, & Roosa, 1993). This is a critical but often overlooked component of successful school programs. Findings from the process evaluation for this study indicated strong school support

for the Opening Doors program (Rye, Heathcote, & Steep, 1998). This positive response may have resulted from intensive efforts on the part of organizational staff and program leaders to clarify in a timely fashion the extent of school involvement in the research process and to inform school staff, parents, and students of program content and objectives.

Finally, the success of the Opening Doors program may be attributable to its emphasis on building positive life skills. Hansen's (1992) meta-analysis of school-based substance abuse prevention programs found that programs with a life skills component (e.g., components aimed at enhancing social or communication skills) were most consistent in preventing or reducing drug use.

Limitations and Directions for Future Research

Although we have identified several positive aspects of this study, several limitations must be acknowledged. Because it is difficult (if not impossible) to rule out all alternative explanations for the study findings, it is important to be mindful when interpreting the results. For example, fiscal constraints, ethical concerns, as well as some resistance among participant schools and school boards prevented random assignment of schools to conditions. In addition, in experimental schools students were invited to participate in the Opening Doors program on a voluntary basis, a circumstance that may have led to some self-selection bias. Subsequently we found evidence of experimental versus control group nonequivalence at pretest for a number of study outcomes. Although many of these variables were included as covariates in the analyses, it is possible that experimental students differed from controls on attributes not captured by our instruments, which may have influenced both the program and dependent variables.

Second, roughly 42% of all grade 9 students in our study did not participate in the screening questionnaire, possibly because of the necessity of obtaining active parental consent or fears of being selected into the program. Among experimental school participants 215 were identified as potential program candidates. Just under half eventually ended up in the program, with a further reduction across testing occasions due to attrition. Evidence suggests that students who do not participate in the completion of surveys are more likely than participants to be truant, sexually active, and heavily involved in drug use and other delinquent activity (Farrell, 1993). Moreover, passively consenting students are more likely than actively consenting students to be disenfranchised in school, score low on self-esteem, have parents with a below-average education, take risks, and engage in health-compromising behavior (e.g., cigarette smoking, Dent, Galaif, Sussman, Stacy, Burton, & Flay, 1993). In our study the exclusion of these nonparticipants may have diluted our sample, leaving a somewhat "less risky" group of students participating in the experimental and control conditions. It could also explain why just over half of the respondents in our final sample consisted of girls, with a higher than expected proportion of boys and girls living with both parents and reporting postsecondary parental education. Future evaluations of the Opening Doors program will need to obtain larger samples and find more effective ways of minimizing nonresponse at all levels of the recruitment process in order to generalize program effects to a broader range of at-risk youth and various subgroups (males vs. females, students from high vs. low SES backgrounds).

Convincing at-risk youth and their families to participate in targeted intervention programs is perhaps one of the greatest challenges facing program developers and evaluators in the field of drug prevention. Clearly, new and innovative ways of involving students and their families are needed to ensure optimal response rates. For example, parents may be more willing to consent to their child's involvement in a program and to participate themselves if the school is also actively involved in the screening process. Using school records regarding a child's academic performance and behavior (e.g., suspensions, detentions, and missed classes) as part of the identification procedure is one possibility. Eggert et al. (1994) suggest a two-step approach: the creation of a second *intend-to-treat* control group composed of youth who refused to participate in the intervention program and the inclusion of items tapping individual motivations to change. Together these steps would help to quantify the extent of the selection problem and at the same time evaluate program effectiveness in terms of fostering individual readiness to change.

Rather unexpectedly, there was an absence of program impact for most of the psychosocial outcomes, in particular, self-esteem, self-concept, and perceived competence. Usually, psychosocial gains in such realms as self-esteem are attributed to the cause of behavior change and program success. Because we did not find these traditional psychosocial changes, it is unclear how the program operated to produce positive changes in several of the drug use measures and at least one of the deviance outcomes.

Previous evaluations of drug prevention programs involving school-based populations have typically found improvement of psychosocial outcomes with less success in changing intentions or actual behavior (Tobler, 1986). One explanation for the absence of significant program effects in this study may lie in the risk profile of the students participating in the evaluation. In the screening process, low self-esteem might not have operated as a potent risk factor for drug use and other deviant behavior, and thus both groups of at-risk students (i.e., experimental and controls) would not necessarily have scored below average on this measure. Alternatively, the influence of the parent program may have affected the outcome measures. For instance, some parent involvement could have resulted in better family management techniques and warmer parent-child relations that in turn led to positive changes in drug using behavior. Future evaluations of the Opening Doors program are needed to assess the relative effectiveness of the parent and student program components.

Finally, although studies have shown that adolescents generally provide reliable responses to questions on drug use and other deviant behavior (Poulin, MacNeil, & Mitic, 1993; Winters, Stinchfield, Henly, & Schwartz, 1990-1991), inconsistencies in self-reports of drug use and other deviant behavior have been known to increase steadily with the passage of time, with the least stable response patterns occurring for more serious forms of behavior. It has also been shown that some systematic bias does exist in the form of underreporting of behaviors or experiences viewed as socially undesirable or of a sensitive nature (Eggert et al., 1994). Obviously, more extensive outcome evaluations of the Opening Doors program should supplement student self-reports of attitudes and behavior, with collateral reports by parents or teachers as well as school records on academic performance and behavioral problems. These additional

informants would provide a means of validating student self-reports and allow investigators to make more informed judgments about positive program effects.

Summary

In summary, the Opening Doors program offers educators a resource to help combat antisocial behaviors in the school setting. Given the fiscal constraints of most school boards, the Opening Doors program allows for judicious use of scarce resources. It is a targeted prevention program, that is, it is directed toward at-risk populations in contrast to other programs that involve all students and hence are more costly. The results of this study provide empirical support for including more intensive programming efforts like the Opening Doors program in school-based settings.

Notes

1. Fiscal constraints, ethical concerns, and difficulties working with certain school boards prevented random assignment of schools to conditions.
2. To gauge the extent of sample bias due to nonparticipation, we compared prevalence estimates for selected demographic background characteristics and measures of delinquent behavior obtained from students participating in the Opening Doors screening questionnaire (e.g., drug use, truancy) with similar measures obtained for grade 9 students participating in the 1995 ARF Student Drug Use Survey, a representative random probability of Ontario's student population (Adlaf et al., 1995). Results revealed that both samples were similar on several demographic variables including age, sex, living arrangements, and geographic relocation. Similarities were also found in terms of self-reported academic performance and a number of measures of delinquent behavior such as truancy, drug use, and deviant acts.
3. To calculate study design effects, we followed a procedure suggested by Murray and Hannan (1990). Separate ANOVAs were performed with *school* entered as the main effect. In each analysis the dependent variable consisted of an average score across testing occasions. The intraclass correlation (ICC) was obtained by the following formula: $ICC = (MS_{\text{school}} - MS_{\text{error}}) / (MS_{\text{school}} + (n-1) * MS_{\text{error}})$ where *MS* is the mean square obtained from the ANOVA results and *n* refers to the sample size ($n=167$) divided by the number of schools. Resulting ICCs were substituted into an equation to derive the corresponding design effect: $Deff = 1 + (n-1) * ICC$. Consistent with other research (Murray & Short, 1996), design effects tended to be highest for behavioral outcomes such as alcohol and drug consumption and deviant behavior and lowest for psychosocial measures such as self-esteem.
4. For each outcome, demographic and socioeconomic background characteristics entered as model covariates included sex, living arrangements, number of times moved in the past five years, mother's education, church attendance, home ownership (own vs. rent), parental employment status, family income, parental smoking, parental drinking, peer drug use, perceived peer pressure to use drugs, and number of friends involved in deviant activities.

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